

Title (en)  
COVER

Title (de)  
ABDECKUNG

Title (fr)  
COUVERCLE

Publication  
**EP 3791440 B1 20240306 (EN)**

Application  
**EP 19729568 A 20190614**

Priority  
• EP 18183790 A 20180716  
• EP 2019065687 W 20190614

Abstract (en)  
[origin: WO2020015938A1] A passive radio repeater is built into a cover for a pit, in order to relay radio signals between a base station and a wireless communications device such as a water meter at the bottom of the pit. Within the external surface (41, 48) of the lid are provided upper and lower patch antennas (42, 47). The lower antenna (47) has a radiation pattern that extends downwards at right-angles to the plane of the lid, so that it communicates with the device at the bottom of the pit. The top antenna (42) has a directional beam pattern in the elevation plane, achieved achieved by exciting the top antenna in a mode that is higher than fundamental. The two antennas are coupled by a stripline printed circuit board (45) provided with feeds (92, 98) to generate the required beam patterns.

IPC 8 full level  
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CPC (source: EP US)  
**E02D 29/14** (2013.01 - US); **H01Q 1/2233** (2013.01 - EP); **H01Q 1/48** (2013.01 - US); **H01Q 9/0407** (2013.01 - EP); **H01Q 9/045** (2013.01 - US); **H01Q 21/0075** (2013.01 - US); **H01Q 25/005** (2013.01 - EP); **H04B 7/145** (2013.01 - US)

Citation (examination)  
• US 5583492 A 19961210 - NAKANISHI YUTAKA [JP], et al  
• GB 2486675 A 20120627 - DUBLIN INST OF TECHNOLOGY [IE]  
• US 5659300 A 19970819 - DRESSELHUYS DONN R [US], et al  
• WO 2012113397 A1 20120830 - MIITORS APS [DK], et al

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DOCDB simple family (publication)  
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**EP 2019065687 W 20190614**; CN 201980047165 A 20190614; EP 19729568 A 20190614; US 201917250381 A 20190614